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An Account of a Micrometer made of Rock Crystal. By G. Dollond, F.R.S. Read January 25, 1821. [*Phil. Trans.* 1821, p. 101.]

The author's object in this communication is to describe a more simple application of rock crystal to the purposes of micrometrical measurements in telescopes than any hitherto adopted. His improvement consists in the substitution of a sphere of rock crystal, in place of the usual eye-glass, by which the trouble of angular cutting is done away, it being only necessary to form the lens of a proper diameter for the focal length required.

Another advantage obtained by Mr. Dollond's micrometer is that of being able to take the angle on each side zero without reversing the eye tube; and also of taking intermediate angles, by moving the axis in which the sphere is placed; and, thirdly, it possesses the property of an eye tube not intended for micrometrical measurement, for when the axis of the crystal is parallel to that of the object glass, only one image is formed, and that perfectly distinct. After adverting to some other advantages resulting from this improvement, Mr. Dollond proceeds more particularly to describe the contrivance by reference to an annexed drawing.

The Bakerian Lecture. On the best kind of Steel and Form for a Compass Needle. By Captain Henry Kater, F.R.S. Read Feb. 1, 1821. [*Phil. Trans.* 1821, p. 104.]

On the return of the first expedition from the discovery of a North-west Passage, the compasses were reported to have become nearly useless, from the diminution of the directive force consequent upon the near approach to the magnetic pole. The azimuth compasses on that occasion being of the author's invention, he was anxious that the second expedition should be furnished with instruments combining the utmost power and sensibility; and was consequently led to the researches, the mode of conducting which, with their results, form the subject of this lecture.

In respect to the best material for the construction of compass needles, Captain Kater found that clock springs made of sheer steel were capable of receiving the greatest magnetic force, and that in forming the needle it should be exposed as little as possible to heat, by which its capability of receiving magnetism is diminished.

The form best adapted for the needle is the pierced rhombus, of about five inches long and two wide, and it should be tempered by previous hardening at a red heat, and then softened from the middle to about an inch from each extremity, by due exposure to heat, so as to dissipate the blue colour. The polish of the needle appears to have no effect upon its magnetism; but in the same plate of steel, of the size of a few square inches only, portions were found varying considerably in their power of receiving magnetism, though not apparently differing in other respects.

The best mode of communicating magnetism to a needle appears,